MINAR International Journal of Applied Sciences and Technology
ISSN: 2717-8234
Article type: Research Article

Received: 09/10/2022 **Accepted:** 01/11/2022 **Published:** 01/12/2022

EFFECT OF ADDING ALCOHOLIC AND NANO ALCOHOLIC EXTRACT OF MORINGA OLEIFERA LEAVES TO DRINKING WATER ON THE PRODUCTIVE PERFORMANCE OF LAYING HENS

Nihad ABDUL–LATEEF ALI [1]

Al-Qasim Green University, Iraq

Dakhil Hasan ORAIBI[2]

Al-Qasim Green University, Iraq

Abstract:

This study was conducted at Department of Animal Production farm of the college of Agriculture / Al-Qasim Green University the experimental field during twelve weeks from 1/ 9 / 2020 to 23/ 11/ 2020. Aimed to was to know the effect of adding the alcoholic and nano alcoholic extract of Moringa oleifera leaves to drinking water on the productive performance of laying hens , The experiment included 120 laying hens of Lohmann brown at the age of 50 weeks . The breeding period was divided into 3 experimental periods (52-55) weeks, (56-59) weeks and (60-63) weeks of the hens age , distributed randomly to 15 pen with 5 experimental treatments for each treatment of 24 birds. Each treatment included three replicates per 8 bird . Experience treatments were as follows: First treatment: control group free from any addition . Second treatment: drinking water added 10 ml / liter of water from the alcoholic extract of Moringa leaves at a concentration of 1% . Third treatment: drinking water added 10 ml / liter of water to the alcoholic extract of Moringa leaves at a concentration of 2%. Fourth treatment: drinking water added 10 ml / liter of water from the nano alcohol extract of Moringa leaves at a concentration of 0.01% . Fifth treatment: drinking water added 10 ml / liter of water from the nano alcohol extract of Moringa leaves at a concentration of 0.02% , the main results of the study are as follows: Significant improvement ($p \leq 0.05$) for the fourth treatment in the percentage of egg production , the number of cumulative eggs, egg mass and feed conversion ratio compared to the first treatment (control group). The fifth treatment recorded the best shell thickness , Albumin height and Hu unit, with a significant difference ($p \leq 0.05$) compared to the first treatment (control).

Keywords: Moringa oleifera leaves, Nano Alcoholıc Extract.

http://dx.doi.org/10.47832/2717-8234.13.4

[1] dr.nihad@agre.uoqasim.edu.iq

This article has been scanned by **iThenticat** No **plagiarism** detected

Introduction:

The plant kingdom is rich in its secondary products distinguished by its vital activity and its physiological effect as a treatment against incurable diseases that afflict humans and animals (Hassan, 2010). Medicinal plants and herbs have benefits that have been recognized by humans thousands of years ago due to the belief that they are reliable and more effective compared to traditional medicines (Alsarhan *et al.*). Among these plants is *Moringa oleifera*, whose scientific name is *Moringa oleifera* in the Arabs. It is called the miracle tree or the tree of life because one seed gives a tree up to five meters in height in its first year and is widespread throughout the tropics (Olugbemi *et al.*, 2010) Its effectiveness lies in containing Flavonoid, Saponins, Tannins, Terpenoids Sterol glycoside, (Nazmy *et al.*, 2016), tolerates drought and salinity, and is characterized by rapid growth (Donkor et al., 2013). Its leaves are considered edible and are of great nutritional value and therapeutic value due to their rich content of vitamins (A and C) minerals, especially calcium and potassium, and they contain many antioxidants, amino acids and carotenoids (Ni). Had *et al.*, 2016). As for toxic metals such as mercury, arsenic and cadmium, they are absent from leaves *Moringa oleifera* (Murro *et al.,* 2003).

Alcoholic Moringa leaf extracts are also characterized by having important biological properties, and these properties differ according to the type of solvent used in extracting the active substances contained in these leaves (Doughari *et al.,* 2007), where according to Bukar et al. (2010) the alcoholic extract of Moringa leaves has a significant and more effective effect. on pathogenic bacteria compared to the aqueous extract. In the absence of studies on the addition of alcoholic and nano-alcoholic extract of Moringa oleifera leaves to drinking water of laying hens. This study came to determine and evaluate the efficiency of alcoholic and nano-alcoholic extract and study the extent of their impact on production performance as well as knowledge of the effective compounds and nutritional value of *Moringa oleifera* leaves

Materials and Methods

This study was conducted in the fields of the Department of Animal Production of the College of Agriculture / Al-Qasim Green University for the period from 1/9/2020 to 23/11//2020 for the purpose of studying the effect of adding alcoholic and nano-alcoholic extract of Moringa oleifera leaves to drinking water on the productive performance of laying hens.

The experiment included five treatments within one treatment, three replicates, with (8) chickens per replicate. The herd was fed on the ration shown in Table (1), and the amount of feed intake for the chicken was calculated according to what is found in the guide to breeding brown lohman and the experiment lasted 12 weeks, and the addition of Alcoholic and Nanoalcoholic Extract of Moringa Leaves to Drinking Water.

Table (1) the production Feed materials used during the experiment and its chemical composition

Feed material	**percentage(%)**
yellow corn	55.56
Soybean cake (44% protein)	29.1
Premix*	2.5
Sunflower oil	2.7
limestone	8.36
Table salt	0.3
Di-Calcium Phosphate	1.4
Lysine	0.04
Methionine	0.04
Total	100
Chemical analysis**	
The energy represented in kg / kg	2753
Crude protein(%)	17.52
Available phosphorous(%)	0.60
Calcium(%)	4.02
Lysine(%)	1.0
Methionine %	0.47
Methionine + cysteine%	0.76

*Each kilogram of premix consists of: 4% crude protein, 550 kg energy represented, 16% calcium, 10.6% phosphorus, 4.0% sodium, 2750 mg manganese, 1670 mg iron, 2670 mg zinc, 335 mg copper, 8.35 mg cobalt, 50 mg Iodine, 6.7 mg selenium, 27 mg methionine, 27.6 methionine with cysteine, 1,350 mg niacin, 400,000 international units vitamin A, 85,000 mg vitamin D3, 1,400 mg vitamin E, 100 mg vitamin K3, 85 mg vitamin B1, 200 mg vitamin B2, 400 mg vitamin B6 and 680. 0 mg vitamin B **The chemical composition was calculated according to the feed material analyzes reported in NRC (1994).

The completely randomized design was used to study the effect of different treatments on the studied traits, the significant differences between the averages were compared using Duncan's Multiple Range Test (Duncan , 1955) and the SAS (SAS , 2016) was used to analyze the data.

Results and discussion

Table 2 shows the effect of adding alcoholic and nano-alcoholic extract of Moringa oleifera leaves to drinking water on the percentage of egg production (H.D%) for brown Lohman laying hens from 63-52 weeks (mean ± standard error), as we note from the first productive period (52-55) Significant improvement (P≤ 0.05) for the fourth treatment (nanoalcoholic extract at a dose of 10 mg and a concentration of 0.01% / liter of water) and the fifth treatment (nanoalcoholic extract at a dose of 10 mg and at a concentration of 0.02% / liter of water) over the first treatment (control) in the percentage of egg production either For the second treatment (alcoholic extract at a dose of 10 mg and a concentration of 1% / liter of water) and the third treatment (alcoholic extract at a dose of 10 mg and at a concentration of 2% / liter of water), there were no differences For the second productive period (56-59) weeks, we note that the fourth treatment recorded the highest percentage of

egg production (H.D%) with a significant difference (P≤ 0.05) over the first treatment (control), which recorded the lowest percentage of egg production, either For the rest of the second, third and fifth treatments, there were no significant differences between them and the first and fourth treatments, while in the third productive period (60-63) a week, we note the continued superiority of the fourth treatment significantly (P≤ 0.05) over the first treatment (control), which recorded the highest The percentage of egg production reached 81.88%, while the first treatment (control) was lower The percentage of egg production reached 66.31%. As for the rest of the second, third and fifth treatments, no significant differences were recorded between them and the first and second treatments, and in the total productive period (52-63) a week, we notice the superiority of the fourth and fifth treatments significantly (P≤ 0.05 in the egg production rate in the first treatment (control group), while the second and third treatments did not record any significant differences between them and the rest of the experimental treatments.

Table 2 Effect of adding alcoholic and nano-alcohol extract of *Moringa oleifera* leaves to drinking water on the percentage of egg production (H.D%) for brown Lohman laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period)52-63 (**
First treatment	**68.32 ±3.15 b**	**65.32 ±4.33 b**	**66.31 ±2.15 b**	**66.65 ±2.97 b**
Second treatment	**76.63 ±5.88 ab**	**68.25 ±8.43 ab**	**74.53 ±5.88 ab**	**73.13 ±5.24 ab**
Third treatment	**77.22 ±5.61 ab**	**74.61 ±7.14 ab**	**73.61 ±5.61 ab**	**75.14 ±5.21 ab**
Fourth treatment	**87.05 ±4.56 a**	**85.66 ±7.48 a**	**81.88 ±4.56 a**	**84.86 ±4.90 a**
Fifth treatment	**83.92 ±3.41 a**	**73.50 ±3.11 ab**	**73.01 ±3.41 ab**	**76.81 ±3.97 a**
Significant level	*	*	*	*

* The first treatment (control) drinking water without any addition, the second and third treatment adding the alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2%, respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively.

* It means that there are significant differences between the treatments at the level of significance (P≤0.05) .

It is noted from Table 3 the effect of adding alcoholic and nano-alcoholic extract of Moring oleifera leaves to drinking water on the cumulative eggs of Lohman brown laying hens

from the period (52-63) weeks (mean ± standard error), where the fourth and fifth treatments recorded a significant superiority (P ≤ 0.05).) in the cumulative number of eggs (egg/chicken 28/day) in the first treatment (control group), while there were no significant differences between the second and third treatments from the rest of the experimental treatments, but in the second and third productive periods, the fourth treatment recorded a significant superiority (P≤ 0.05). Where the highest cumulative number of eggs was recorded . It reached 23.98 and 22.92 (egg/chicken 28/day), respectively, compared to the first treatment (control), which recorded the lowest number of cumulative eggs, amounting to 18.28 and 18.56 (egg/hen 28/day), respectively, as for the rest of the second, third and fifth treatments. There were no significant differences between it and the first and fourth treatments, while in the total productive period (52-63) weeks, we notice the continued superiority of the fourth treatment significantly (P≤ 0.05) over the first treatment (control), which recorded the lowest number of cumulative eggs, while there were no significant differences between them and the first and fourth treatments. There are significant differences between the second, third and fifth treatments from the first and fourth treatments.

Table 3 Effect of adding alcoholic and nano-alcohol extract of *Moringa oleifera* leaves to drinking water on the cumulative eggs of Lohman brown laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period (52-63)**
First treatment	19.12 ±1.39 b	18.28 ±1.31 b	18.56 ±0.60 b	18.66 ±0.83 b
Second treatment	21.45 ±0.43 ab	19.11 ±2.36 ab	20.86 ±1.64 ab	20.47 ±1.47 ab
Third treatment	21.62 ±1.29 ab	20.89 ±1.99 ab	20.61 ±1.57 ab	21.03 ±1.45 ab
Fourth treatment	24.37 ±0.91 a	23.98 ±1.09 a	22.92 ±1.27 a	23.76 ±1.37 a
Fifth treatment	23.49 ±1.04 a	20.58 ±0.87 ab	20.44 ±0.95 ab	21.50 ±0.55 ab
Significant level	*	*	*	*

• The first treatment (control) drinking water without any addition, the second and third treatment adding the alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2%, respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively.

• * It means that there are significant differences between the treatments at the level of significance (P≤0.05) .

Table 4 indicates the effect of adding alcoholic and nano-alcohol extract of Moringa oleifera leaves to drinking water on the average egg weight (gm) for brown Lohman laying hens from the period (63-52) weeks (mean ± standard error), where we note that there are no significant differences between all treatments The experiment and in the different three productive periods in addition to the total productive period in the characteristic of egg weight .

Table 4 Effect of adding alcoholic and nano-alcohol extract of *Moringa oleifera* leaves to drinking water on average egg weight of brown Lohman laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period (52-63)**
First treatment	66.33 ±1.33	65.66 ±1.20	67.00 ±0.57	66.33 ±0.88
Second treatment	66.66 ±0.33	67.33 ±0.66	68.00±0.57	67.33 ±0.66
Third treatment	66.00 ±1.00	66.66 ±0.33	68.00 ±0.57	66.88 ±0.33
Fourth treatment	65.33 ±0.33	66.00 ±0	68.33 ±0.88	66.55 ±0.33
Fifth treatment	65.33 ±1.20	66.33 ±0.88	68.00 ±0.57	66.55 ±0.66
Significant level	N.S	N.S	N.S	N.S

* The first treatment (control) drinking water without any addition, the second and third treatment adding alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2% respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively.

* N.S: Means that there are no significant differences between the transactions.

Table 5 shows the effect of adding alcoholic and nano-alcohol extract of Moringa oleifera leaves to drinking water on egg mass (gm/bird/day) for brown Lohman laying hens from the period (63-52) weeks (mean ± standard error), where we notice that in the first productive period, the two treatments exceeded The fourth and fifth significantly ((P≤ 0.05) in the first treatment (control group) in the trait of egg mass, which recorded the highest mass of eggs, which amounted to 56.86 and 54.82 (gm/bird/day), respectively, while the first treatment recorded the lowest mass of eggs, which amounted to 45.31 (gm/bird). /day) As for the second and third treatments, there were no significant differences between them and the rest of the experimental treatments, and during the second productive period (56-59) weeks and the third productive period (60-63) One week, the fourth treatment was significantly (P≤ 0.05) superior and recorded the highest egg mass, which amounted to 56.53 and 55.94 (gm/bird/day), respectively, compared to the first treatment (control), which recorded the

lowest egg mass, which was 42.88 and 44.42 (gm/bird/day).) respectively, while there were no significant differences between the second, third and fifth treatments and between the first and fourth treatments in both periods, while in the total productive period (52-63) a week, the fourth treatment continued to be significantly superior (P≤ 0.05 over the first treatment (control) and recorded The highest mass of eggs was 56.47 (gm / bird / day) compared to the first treatment, which recorded the lowest mass of eggs was 44.20 (gm / bird / day), while there were no significant differences between the second, third and fifth treatments and between the first and fourth treatments.

Table 5 Effect of adding alcoholic and nano-alcohol extract of *Moringa oleifera* leaves to drinking water on the egg mass of brown Lohman laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period)52-63 (**
First treatment	**45.31 ±2.75 b**	**42.88 ±3.47 b**	**44.42 ±1.18 b**	**44.20 ±2.00 b**
Second treatment	**51.08 ±3.80 ab**	**45.95 ±5.16 ab**	**50.68 ±3.60 ab**	**49.23 ±3.15 ab**
Third treatment	**50.96 ±3.67 ab**	**49.73 ±4.53 ab**	**50.05 ±3.77 ab**	**50.25 ±3.37 ab**
Fourth treatment	**56.86 ±2.37 a**	**56.53 ±4.93 a**	**55.94 ±2.40 a**	**56.47 ±3.14 a**
Fifth treatment	**54.82 ±2.67 a**	**48.75 ±2.14 ab**	**49.64 ±2.49 ab**	**51.11 ±4.07 ab**
Significant level	*	*	*	*

- The first treatment (control) drinking water without any addition, the second and third treatment adding alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2% respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively.

* It means that there are significant differences between the treatments at the level of significance (P≤0.05) .

Table 6 shows the effect of adding alcoholic and nano-alcoholic extract of Moringa oleifera leaves to drinking water on the feed conversion factor of brown Lohman laying hens from the period (63-52) weeks (mean ± standard error), where the fourth and fifth treatments recorded the best food conversion factor, which amounted to 2.02 and 2.09 (gm feed/gm

eggs), respectively, with a significant difference (P≤ 0.05) over the first treatment (control), which recorded the lowest food conversion factor of 2.53 (gm feed/gm eggs), while there were no significant differences between the second and third treatments and the rest Experiment transactions, and this is during the first productive period (52-55) weeks, as for the second productive period, no significant differences were recorded between all the treatments, while during the third productive period (60-63) One week, the second, third and fourth treatments were significantly (P≤ 0.05) superior, which recorded the best food conversion factor, which was 1.97, 1.99 and 1.78 (gm feed/gm eggs), respectively, compared to the first treatment (control), which recorded a food conversion factor of 2.25 (gm feed). /gm eggs), while there were no significant differences between the fifth treatment and between the first, second, third and fourth treatments, and in the total productive period, the fourth treatment significantly outperformed (P≤ 0.05) and recorded the best food conversion factor of 1.85 (gm feed/gm eggs) compared to the first treatment (Control), which recorded a food conversion factor of 2.37 (gm of feed / gm of eggs), while there were no significant differences between the second, third and fifth treatments and between the first and fourth treatments.

Table 6 The effect of adding alcoholic and nano-alcohol extract of *Moringa oleifera* leaves to drinking water on the feed conversion factor of brown Lohman laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period)52-63 (**
First treatment	**2.53 ±0.14 a**	**2.33 ±0.23**	**2.25 ±0.06 a**	**2.37 ±0.14 a**
Second treatment	**2.25 ±0.18 ab**	**2.17 ±0.22**	**1.97±0.13 b**	**2.13 ±0.13 ab**
Third treatment	**2.25 ±0.16 ab**	**2.01 ±0.18**	**1.99 ±0.14 b**	**2.08 ±0.14 ab**
Fourth treatment	**2.02 ±0.08 b**	**1.76 ±0.19**	**1.78 ±0.08 b**	**1.85 ±0.10 b**
Fifth treatment	**2.09 ±0.09 b**	**2.05 ±0.09**	**2.01 ±0.17 ab**	**2.05 ±0.16 ab**
Significant level	*	**N.S**	*	*

• The first treatment (control) drinking water without any addition, the second and third treatment adding the alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2%, respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively.

• * It means that there are significant differences between the treatments at the level of significance (P≤0.05)). N.S: Means that there are no significant differences between the transactions.

Table 7 shows the effect of adding alcoholic and nano-alcoholic extract of *Moringa oleifera* leaves to drinking water on the water consumption rate (ml) for brown Lohman laying hens from the period (63-52) weeks (mean ± standard error), where we note that there are no significant differences between all treatments and in All production periods (first, second and third) as well as during the total production period in the rate of water consumption.

Table 7: Effect of adding alcoholic and nano-alcoholic extract of *Moringa oleifera* leaves to drinking water on water consumption rate (ml) for brown Lohman laying hens from the period (52-63) weeks (mean ± standard error)

Age by week / **Treatments**	**First period (52-55)**	**Second period (56 -59)**	**Third period (60 -63)**	**Total Period)52-63 (**
First treatment	207.41 ±0.94	205.89 ±0.67	201.79 ±0.33	205.03 ±0.18
Second treatment	207.04 ±0.79	206.22 ±1.13	203.32±0.54	205.52 ±0.72
Third treatment	207.36 ±1.21	206.10 ±1.71	203.35 ±0.31	205.60 ±0.31
Fourth treatment	207.32 ±1.13	207.03 ±0.87	203.66 ±1.07	206.00 ±0.30
Fifth treatment	207.05 ±1.32	205.52 ±1.17	203.25 ±1.09	205.27 ±0.82
Significant level	N.S	N.S	N.S	N.S

The first treatment (control) drinking water without any addition, the second and third treatment adding alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2% respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of water Drink at a concentration of 0.01 and 0.02%, respectively. N.S: Means that there are no significant differences between the transactions.

Through the results that included the productive characteristics studied in the experiment, it was found that there was a significant improvement in favor of the treatments of the nano-alcoholic extract of Moringa leaves, and this improvement resulted from that Moringa leaves improve the productive performance of females by stimulating the secretion of the ovarian hormones progesterone and estrogen (Ogunsola et al., 2017). Moringa leaves also stimulates the follicle-stimulating hormone (FSH), which increases follicles inside the ovary, which enhances the secretion of oestradiol, which is produced by the cells of the follicles (Grover et al., 2005) because Moringa leaves contain plant compounds that directly affect the gland. The pituitary gland, which leads to an increase in the concentration of FSH and Luteinizing Hormone (LH) (Altinterim, 2014), Moringa leaves also contain antioxidants

such as flavonoids and multiple phenols that eliminate free radicals and protect the cell from oxidation (Chatterjee *et al.*, 2017). Oxidative chain reactions that are synthesized by free radicals from cell membranes and secondary cells that are rich in polyunsaturated fats (Kumar et al., 2004) and this synergistic action between vitamins E and C reduces the oxidation of low-density lipoproteins (Ferreira et al., 2008). And thus reduce the fat formed around the ovary, which leads to increased production.

Table 8 indicates that there are no significant differences between the experimental treatments in the different productive periods of the relative weight of the crust %, as for the thickness of the crust, no significant differences were recorded between the experiment treatments in the three productive periods (first, second and third), while there was a significant superiority ($P \leq 0.05$ for the fifth treatment in the thickness of the crust (mm) and it amounted to 0.308 mm compared to the first treatment (control), which recorded the lowest thickness of the crust and it was 0.300 mm in the general average. As for the rest of the second, third and fourth treatments, there were no significant differences between them and between the first and fifth treatments As for the relative weight of the yolk %, no significant differences were recorded between the experimental treatments and in the different production periods, including the general average.

Table 8: Effect of adding alcoholic and nano-alcoholic extract of *Moring oleifera* leaves to drinking water on the qualitative characteristics of eggs, the Shell relative weight (%), the Shell thickness (mm), the Yolk relative weight (%) of the brown Lohman laying hens from the period (52-63) weeks. mean ± standard error)

Treatments	Shell relative weight(%) (age in weeks)				Shell thickness (mm) (age in weeks)				Yolk relative weight(%) (age in weeks)			
	)52-55(	)56-59(	)60-63(	)52-63(	)52-55(	)56-59(	)60-63(	)52-63(	)52-55(	)56-59(	)60-63(	)52-63(
First treatments	10.40 ± 0.52	10.43 ± 0.28	11.01 ± 0.32	10.61 ± 0.25	0.303 ± 0.002	0.298 ± 0.003	0.311 ± 0.004	0.300 b ± 0.000	22.16 ± 0.48	25.75 ± 0.22	24.16 ± 0.85	24.02 ± 0.34
Second treatments	10.03 ± 0.34	10.64 ± 0.22	10.84 ± 0.16	10.50 ± 0.15	0.303 ± 0.004	0.295 ± 0.003	0.310 ± 0.003	0.303 ab ± 0.003	22.74 ± 0.33	24.51 ± 1.04	24.59 a ± 0.61	23.94 ± 0.57
Third treatments	10.82 ± 0.20	10.81 ± 0.46	11.12 ± 0.32	10.91 ± 0.13	0.301 ± 0.005	0.300 ± 0.006	0.316 ± 0.003	0.303 ab ± 0.003	22.66 ± 0.34	25.21 ± 0.79	24.31 a ± 0.61	24.06 ± 0.52
Fourth treatments	10.86 ± 0.36	10.24 ± 0.51	11.11 ± 0.25	10.73 ± 0.24	0.303 ± 0.002	0.308 ± 0.004	0.315 ± 0.004	0.305ab ± 0.002	23.12 ± 0.55	26.07 ± 0.52	24.65a ± 0.84	24.61 ± 0.32
Fifth treatments	10.56 ± 0.44	10.77 ± 0.47	11.25 ± 0.23	10.86 ± 0.16	0.303 ± 0.002	0.310 ± 0.005	0.316 ± 0.003	0.308 a ± 0.001	22.47 ± 0.63	25.58 ± 0.52	24.17a ± 1.02	24.07 ± 0.44
Significant level	N.S	N.S	N.S	N.S	N.S	N.S	N.S	*	N.S	N.S	N.S	N.S

The first treatment was the control of drinking water without any addition, the second and third treatment adding the alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2%, respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 0.01 and 0.02%, respectively.* It means that there are significant differences between the treatments at the level of significance (P≤ 0.05)

N.S.: It means that there are no significant differences between the treatments

It is noted from Table 9 that there were no significant differences between the experimental treatments and in all production periods and in the general average of the relative weight of Albumin %, while in the characteristic of height of Albumin (mm) we note the superiority of the third treatment significantly (P≤ 0.05), which recorded the best height of Albumin amounted to (9.74 mm).) on the first treatment (control), which recorded the lowest Albumin height (8.81 mm) in the first productive period (52-55) weeks. As for the rest of the second, fourth and fifth treatments, no significant differences were recorded between them and the first and third treatments. In the second productive period (56-59) weeks, the fifth treatment was significantly superior (P≤ 0.05, as it recorded the highest rise of Albumin and reached (9.21 mm) compared to the first treatment (control), which recorded the lowest rise of Albumin and reached (7.93 mm), as for the The second, third and fourth treatments, there were no significant differences between them and the first and fifth treatments, while during the third productive period (60-63) a week, the results of the statistical analysis did not show any significant differences between all treatments, but in the general average a significant superiority was obtained (P≤ 0.05) for the fifth treatment, which recorded the highest Albumin height of 9.75 mm compared to the first treatment (control), which recorded the lowest Albumin height of 9.01 mm, while there were no significant differences between the second, third and fourth treatments. And between the first and fifth treatments, and from the same table, we notice that there are no significant differences between all the treatments in the character of the Hugh unit during the first and second productive periods. As for the third productive period (60-63 weeks), a significant superiority (P≤ 0.05) was obtained in the fifth treatment, where The best rate for Hugh unit was recorded at 94.42 compared to the first, second and third treatments, which recorded the lowest rate for Hugh unit at 87.70, 89.38 and 89.59, respectively. As for the fourth treatment, there were no significant differences between it and the rest of the transactions. In the general average (52-63) a week, the fifth treatment continued to be significantly superior (P≤ 0.05), as it recorded the highest rate of Hugh unit compared to the first treatment (control), which recorded the lowest rate of Hugh unit, while there were no significant differences between the second, third and fourth treatments and between The first and fifth treatments .

Table 9: Effect of adding alcoholic and nano-alcoholic extract of *Moringa oleifera* leaves to drinking water on the qualitative characteristics of eggs (Relative Albumin Weight (%),Albumin Height (mm) , Hugh unit) for brown laying hens from the period (52-63) weeks (mean ± error) standard)

Treatments	Relative Albumin Weight(%) (age in weeks)				Albumin Height (mm) (age in weeks)				Hugh Unit (age in weeks)			
	52-) (55	56-) (59	60-) (63	52-) (63	52) (-55	56) (-59	60-) (63	52) (-63	52-) (55	56-) (59	60-) (63	52-) (63
First treatments	63.40 ± 0.96	61.85 ± 0.43	60.05 ± 1.05	61.76 ± 0.43	8.81 b ± 0.32	7.93 b ± 0.22	10.29 ± 0.25	9.01 b ± 0.10	92.13 ± 1.52	98.87 ± 0.98	87.70 b ± 1.23	92.90 b ± 0.46
Second treatments	61.87 ± 0.59	61.79 ± 0.91	61.08 ± 0.86	61.58 ± 0.42	9.38 ab ± 0.33	8.34 ab ± 0.13	10.39 ± 0.17	9.37 ab ± 0.19	93.85 ± 1.53	99.25 ± 0.83	89.38 b ± 0.66	94.16 ab ± 0.91
Third treatments	63.53 ± 0.72	61.96 ± 0.51	61.72 ± 0.78	62.40 ± 0.45	9.74 a ± 0.15	8.36 ab ± 0.40	10.34 ± 0.17	9.48 ab ± 0.13	96.11 ± 0.73	99.23 ± 0.77	89.59 b ± 2.14	94.97 ab ± 0.69
Fourth treatments	63.65 ± 1.03	61.53 ± 0.43	61.54 ± 1.02	62.24 ± 0.53	9.46 ab ± 0.18	8.78 ab ± 0.38	10.42 ± 0.32	9.55 ab ± 0.25	94.66 ± 0.80	99.73 ± 1.29	91.65 ab ± 2.22	95.34 ab ± 1.25
Fifth treatments	62.76 ± 0.89	62.00 ± 0.64	60.26 ± 0.65	61.67 ± 0.38	9.61 ab ± 0.33	9.21 a ± 0.17	10.45 ± 0.10	9.75 a ± 0.11	95.71 ± 1.33	99.69 ± 0.43	94.42 a ± 0.93	a 96.60 ± 0.44
Significant level	N.S	N.S	N.S	N.S	*	*	N.S	*	N.S	N.S	*	*

The first treatment was the control of drinking water without any addition, the second and third treatment adding the alcoholic extract of Moringa leaves at a dose of 10 ml / liter of drinking water at a concentration of 1 and 2%, respectively, and the fourth and fifth treatment adding the alcoholic extract of the moringa leaves at a dose of 10 ml / liter of drinking water and with a concentration of 0.01 and 0.02%, respectively.* Means that there are significant differences between the treatments at the level of significance (P≤ 0.05)

N.S: It means that there are no significant differences between the treatments

The results of the experiment show the significant improvement in some qualitative characteristics of the egg for the fifth treatment (shell thickness, Albumin height, Hugh unit), which may be due to the role of Moringa leaves in improving these characteristics compared to the first treatment (control), and this improvement may be attributed to the use of alcoholic extract The nanoparticles of Moringa leaves in drinking water to the nutrients of amino acids,

sugars, fatty acids and minerals found in Moringa leaves and because of their prominent role in the vital activities and metabolic processes inside the body (Dasat et al., 2020). The reason for the moral improvement in the thickness of the crust in the fifth treatment may be that the Moringa leaves contain a high percentage of calcium, and this explains the noticeable improvement in the thickness of the crust (Ustundag and Ozdogan, 2016).

As for the moral improvement in Albuminness and Hugh unit in the fifth treatment, it may be due to the role of Moringa leaves in improving the internal quality characteristics of the egg because of its role in reducing the internal oxidation factors, which is reflected on the health status of the chicken (Ebenebe et al., 2013) or it may have stimulated Cell growth and development Somatic cells stimulate the bulk area of the oviduct to produce and secrete egg Albumins and stimulate the growth, development and proliferation of somatic cells (Al-Daraji et al., 2008).

References:

Ibrahim, Khalil Ismail 2000. Poultry feeding. Ministry of Higher Education and Scientific Research - University of Mosul. Second Edition.

Al-Daraji, Hazem Jabbar, Al-Hayani, Walid Khaled and Al-Hussaini, Ali Sabah. 2008. Bird blood physiology, Ministry of Higher Education and Scientific Research, University of Baghdad - College of Agriculture.

Al-Fayad, Hamdi Abdulaziz and Naji, Saad Abdul-Hussein. 1989. Poultry Products Technology.

Hassan, Susan Kamran. 2010. Effect of anise seed oil and extracts on some microorganisms. Diyala Journal of Agricultural Sciences, 2 (2): 9-17.

Naji, Saad Abdul-Hussein, Ghaleb Alwan Al-Qaisi, Rafid Abdul-Abbas Al-Khalidi and Yahya Khalid Abdul-Rahman 2007.. A guide to commercial laying hens production. Iraqi Federation of Poultry Producers, Iraqi Poultry Science Association.

Alsarhan, A; Sultana, N; Al-Khatib, A. and Kadir, M. R. A. 2014. Review on some Malaysian traditional medicinal plants with therapeutic properties. Journal of Basic and Applied Sciences.(10)149-159.

Altınterim, B. 2014. Effects of Herbs on Hypothalamic-Pituitary-Gonadal (HPG) Axis and Hypothalamic-Pituitary-Adrenal (HPA) Axis. Acıbadem Üniversitesi Sağlık Bilimleri Dergisi, 5(3).

Bassey B Rosemary; Danladi N Bala; Innocent A Edagha; Aniekan I. and Peter. 2013 . The effect of ethanol extract of Moringa oleifera on alcohol-induced testicular histopathologies in pre-pubertal albino Wistar rats Biology and Medicine, 5: 40–45, 2013.

Bukar, A. A. Uba. and Oyeyi, T. I. 2010. Antimicrobial profile of Moringa oleifera Lam. extracts against Mal. J. Microbiol., 8(2): 59-67.

Chatterjee, P. K; Anantharaya, V. N. M; Shiva, R. K; Kumar, N. A; Shetty, S. B; Budihal, S. V. and Bhat, M. R. 2017. Pre and Post-Treatment Effects: Estimation of Serum Testosterone and Lipid Peroxidation Levels on Moringa olifera Extract Induced Cadmium Exposed Rats. Pharmacognosy Journal, 9(6).

Dasat ,G. S; G. Danjuma. and E. S. Chundusu.2020 . Evaluation of the Nutritionally Valuable Mineral Composition of Moringa oleifera Leaf. European Journal of Nutrition and Food Safety. 12(10): 46-53 .

Donkor, A. M; Kwame Glover, R. L; Addae Daniel. and Kubi K A. 2013. Estimating the nutritional value of the leaves of Moringa oleifera on poultry. Food and Nutrition Sciences 4: 1077– 10 83.

Doughari, J.H; M.S. Pukuma. and De. N. 2007. Antibacterial effects of Balanites aegyptiaca L. Drel. and Moringa oleifera Lam. on Salmonella typhi. African. J. Biotechnol., 6(19): 2212- 2215.

Duncan. B.D. 1955. Multiple range and multiple F-test: Biometrics, 11:1-42.

Ebenebe, C. I; Anigbogu, C. C; Anizoba, M. A. and Ufele, A. N; 2013. Effect of various levels of Moringa leaf meal on the egg quality of ISA Brown breed of layers. Advances in Life Science and Technology, 14, 45-49.

Ferreira, P. M. P; Farias, D. F; Oliveira, J. T. D. A. and Carvalho, A. D. F. U. 2008. Moringa oleifera: bioactive compounds and nutritional potential. Revista de Nutrição, 21(4): 431-437.

Grover, A; Smith, C. E; Gregory, M; Cyr, D. G; Sairam, M. R. and Hermo, L. 2005. Effects of FSH receptor deletion on epididymal tubules and sperm morphology, numbers, and motility. Molecular reproduction and development, 72(2) : 135-144.

Kumar, D; Lundgren, D. W; Moore, R. M; Silver, R. J. and Moore, J. J. 2004. Hydrogen peroxide induced apoptosis in amnion-derived WISH cells is not inhibited by vitamin C. Placenta, 25(4): 266-272.

Murro J K; Muhikambele V. R. M. and Sarwatt S V. 2003. Moringa oleifera leaf meal can replace cottonseed cake in the concentrate mix fed with Rhodes grass (Chloris gayana) hay for growing sheep. Livestock Research for Rural Development. 15, Article 84.

National Research Council (NRC). 1994 . Nutrient requirement of poultry gth Edn. National Academy press. Washington. D. C. USA.

Nazmy, S; Hassan, B; Nihad, A. A; Abeer, E; Abd Elhamid, E. M. and Farid, M. 2016. Biochemical Studies on Moringa Oleifera Leaves Extract. Journal of Biology, Agriculture and Healthcare. 6, (16):33-42 .

Nihad A. A Alnidawi ; Hanaa, F. M. Ali ; Sherein, S. Abdelgayed ; Fatma, A. Ahmed. and M. Farid. 2016. Moringa Oleifera Leaves in Broiler Diets: Effect on Chicken Performance and Health. Food Science and Quality Management.,58:40-48 .

Ogunsola, O. A; Owolabi, J. O; Fabiyi, O. S; Nwobi, N. L; Faluyi, B. and Akinbola, A. S. 2017. Moringa Plant Parts Consumption Had Effects on Reproductive Functions in Male and Female Rat Models. J Med Dent Sci, 16(10), 82-86.

Olugbemi TS; Mutayoba SK; and Lekule FP. 2010. Evaluation of Moringa oleifera leaf meal inclusion in cassava chip based diets fed to laying birds. Livestock Research for Rural Development. 22(6).

Ustundag, A. O., and Ozdogan, M. 2016. Using Moringa Oleifera In Poultry Nutrition. Magnesium (Mg), 2700- 2998.

SAS Statistical Analysis System. 2016 . SAS/STAT® 9.4. User's Guide. SAS *Institute Inc. Cary*, North Carolina.